Logical Building Basic to Advanced By Developers_Route.

Pattern Problems.

- Square Star Pattern
- Inverted Pyramid Star Pattern
- Pyramid Star Pattern
- Diamond Star Pattern
- Hollow Square Star Pattern
- Butterfly Pattern
- Downward Triangle Star Pattern
- Hollow Diamond Star Pattern
- Cross Star Pattern
- Hollow Pyramid Star Pattern

Array Problems

Reverse an array in place.

Find the maximum and minimum elements in an array.

Rotate an array to the right by k steps.

Find the second largest element in an array.

Check if two arrays are rotations of each other.

Find all pairs in an array whose sum equals a target.

Merge two sorted arrays into a single sorted array.

Move all zeros in an array to the end.

Find the length of the longest subarray with a given sum.

Determine if an array contains a subarray with a sum of zero.

String Problems

Reverse a string without using extra space.

Check if a string is a palindrome.

Find the first non-repeating character in a string.

Count the frequency of each character in a string.

Check if two strings are anagrams.

Implement a basic string compression algorithm.

Find the longest common prefix among a set of strings.

Replace all spaces in a string with `%20`.

Find the longest palindromic substring.

Print all permutations of a string.

Recursion Problems

Compute the factorial of a number.

Generate the Fibonacci sequence up to `n`.

Solve the Tower of Hanoi for `n` disks.

Print all subsets of a given array.

Find the nth term of a geometric progression using recursion.

Solve the N-Queens problem for a chessboard of size `n x n`.

Generate all valid combinations of `n` pairs of parentheses.

Perform binary search recursively.

Find the greatest common divisor (GCD) of two numbers using recursion.

Count the number of ways to climb n stairs with steps of 1 or 2.

Mathematical Problems

Check if a number is prime.

Find the sum of all prime numbers up to n.

Determine the number of trailing zeros in the factorial of a number.

Calculate the sum of digits of a number until it becomes a single digit.

Solve modular exponentiation efficiently.

Find all prime factors of a number.

Check if a number is an Armstrong number.

Print the first n perfect numbers.

Determine if a number is a palindrome.

Compute the nth Fibonacci number iteratively.

Bit Manipulation Problems

Check if a number is a power of 2.

Find the only non-repeated number in an array where every other number repeats twice.

Count the number of 1 bits in a number.

Toggle the kth bit of a number.

Find the XOR of all elements in an array.

Projects to Learn Logical Building.

1. Simple Calculator with all mathematics conditions.

2.Build a program to generate fractal patterns like the Sierpiński triangle.

3.Implement a matrix multiplication program.

4.Create a Sudoku solver.

5.Develop a program to check plagiarism in documents by comparing substrings.

6.Create a maze solver using recursion and backtracking.

7.Build a basic file compression algorithm using bit-level operations.